



Leviathan Mine Superfund Site

U.S. Environmental Protection Agency • Region 9 • San Francisco, CA • April 2015

Update on Site Activities

General

Leviathan Mine is an abandoned open-pit sulfur mine. The mine is located approximately 25 miles southeast of Lake Tahoe high on the eastern slope of the Sierra Nevada mountain range, in a remote portion of northeastern Alpine County, CA surrounded by national forest and private land. The acid mine drainage (AMD) from Leviathan Mine has historically contaminated a nine-mile stretch of the Leviathan-Bryant Creek watershed, impacting Leviathan, Aspen, and Bryant Creeks, as well as the East Fork Carson River. In 2000, the U.S. Environmental Protection Agency (EPA) added the mine and the impacted areas (the "Superfund site") to the National Priorities List (NPL). The NPL is the list of the most complex, uncontrolled hazardous waste sites throughout the United States that threaten public health and the environment.

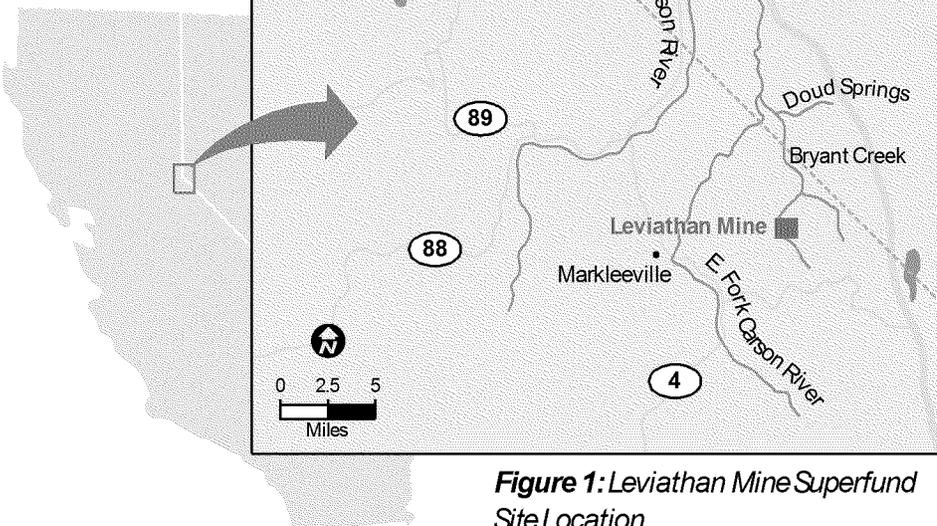


Figure 1: Leviathan Mine Superfund Site Location

Public Meeting Notice

EPA is working with the Washoe Tribe of Nevada & California to host two meetings for the tribal community:

June 9, 2015 – 6 PM
Woodfords Wellness Center

June 10, 2015 – 6 PM
Dresslerville Community Building

The goals of each meeting are to update the Washoe tribal community on site activities and provide an opportunity to listen to community concerns.

The Atlantic Richfield Company (ARC) owned and operated the mine from 1952-1962. The State of California currently owns the mine property. Under EPA oversight, ARC and the State of California are performing ongoing studies to develop a long-term cleanup plan. This part in the Superfund process is called a remedial investigation and feasibility study (RI/FS).

Contamination from Acid Mine Drainage

The historical activities from the Leviathan Mine have created acid mine drainage (AMD), impacting the surrounding environment. Sulfuric acid is created when water (rainwater, snowmelt and subsurface water) interacts with rocks containing sulfur-bearing minerals. The resulting highly acidic water moves into the surrounding environment, such as the groundwater, surface water and soil, and may have harmful effects on humans, animals and plants. In some circumstances, the effects

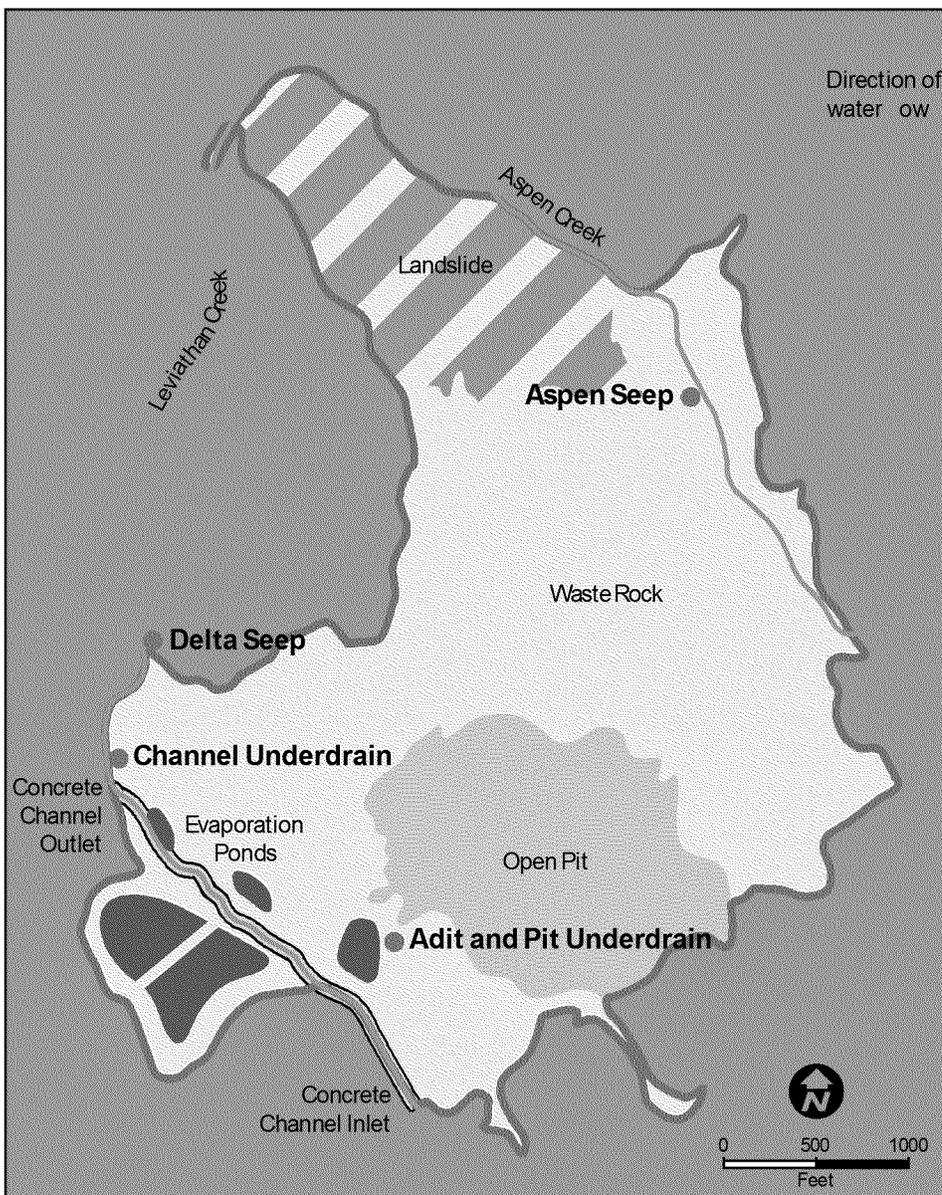
Acid Mine Drainage (AMD)

When highly acidic water that is rich in metals moves (or drains) out of a mined area into the environment

could be irritation to the skin, mild to severe burns, or tissue damage to eyes, nose, mouth or other mucous membranes. At the Leviathan Mine, the AMD contains metals, such as aluminum, arsenic, copper, iron and nickel (see the text box for a full list of COPCs).

Leviathan and Bryant Creeks were essentially devoid of insects and fish from the 1960s until active treatment systems were installed to reduce AMD flowing into the creeks in the early 2000s. EPA's goal is to protect human health and the environment by ensuring the AMD is controlled and cleaned up. Ongoing surveys of stream insects within the Leviathan-Bryant Creek watershed show partial recovery of watershed health and productivity since the treatment systems began operating in 2000.

The States of California and Nevada introduced fish species into the area, including brown trout, brook trout and rainbow trout. These fish are returning to the Leviathan-Bryant Creek watershed as the water quality improves. Preliminary testing for metals in fish does not indicate a concern to people who eat the fish from the greater Leviathan-Bryant Creek watershed. However, fish collected at Bryant Creek upstream of Doud Springs have shown elevated levels of metals in fish that may be a concern for people eating more than five meals of whole body fish per week. EPA is currently studying whether this contamination is related to the Leviathan mine site. Under EPA oversight, ARC is collecting more information to fully understand the risks to human health and the environment.



Contaminants of Potential Concern (COPCs)

Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Hexavalent chromium, Cobalt, Copper, Iron, Lead, Manganese, Mercury, Nickel, Selenium, Silver, Thallium, Vanadium, and Zinc.

Figure 2: Leviathan Mine Superfund Site Contaminant Sources

Background of Early Interim Actions to Treat Acid Mine Drainage

Although a long-term cleanup plan has not been developed, ARC and the State of California are conducting early cleanup activities to reduce the discharge of untreated AMD, under EPA oversight. Since the summer of 2001, both entities have operated treatment systems that have greatly improved the water quality of the Leviathan-Bryant Creek watershed. Combined, these interim treatment systems annually capture nearly two-thirds of the AMD from the mine. The amount of AMD flow these systems treat is dependent on how much water is flowing in the creeks.

The interim treatments systems are (see Figure 2):

- **Delta Seep and Channel Underdrain:** ARC operates a high-density sludge treatment system that treats about six million gallons of AMD flow during the summer months and about three million gallons of AMD flow during early spring to late autumn. This system treats water from the Delta Seep and Channel Underdrain, and the treated water is discharged to Leviathan Creek. This treatment system does not operate during the cold winter months.
- **Adit and Pit Underdrain:** The State of California operates a pond water treatment system that annually treats about five million gallons of AMD flow from the Adit and Pit Underdrain. The treatment system captures the AMD flow and stores it in Evaporation Ponds year-round. The AMD is treated each summer and the treated water is discharged to Leviathan Creek.
- **Aspen Seep:** ARC operates a bioreactor that annually treats about three to four million gallons of AMD from the Aspen Seep. The bioreactor uses bacteria to neutralize acids and remove metals from the water. It operates year-round and the treated water is discharged to Aspen Creek.

Although the AMD treatment has been successful during periods of operation, EPA and stakeholders are learning from these successes to develop a long-term cleanup plan. EPA's mission is to find a long-term, year-round solution at the Leviathan Mine Site that protects human health and the environment.

The Remedial Investigation and Feasibility Study (RI/FS) is Now Underway

The RI/FS is the part of the Superfund process used to determine a long-term cleanup plan. Under EPA oversight, ARC is conducting the RI/FS. The RI gives the site information necessary to complete the ecological and human health risk assessments, and to evaluate cleanup options. Additionally, the RI gathers critical environmental information to help understand the nature and extent of the site contamination and to understand the risks to the community. The FS evaluates cleanup options to reduce those risks and presents recommendations for public comment. As part of the FS, EPA will use the information on the effectiveness, safety, and costs to evaluate the cleanup options.

The RI began in 2008. Over the past seven years, AR has been developing workplans to gather historical information and environmental data. EPA, other federal and state agencies, and the Washoe Tribe of Nevada & California have carefully reviewed the workplans and provided recommendations. Throughout 2015 and 2016, ARC will gather and evaluate more environmental data, under EPA oversight. EPA anticipates that ARC will complete the RI/FS by the end of 2017.

Washoe Tribe of Nevada & California Role

EPA's Policy on Consultation and Coordination with Indian Tribes discusses EPA's responsibilities to work government-to-government with federally recognized tribes. Part of this responsibility includes consulting with tribes and considering their interests when taking action that may affect them or their resources. The Washoe Tribe supported EPA's efforts to add the site to the National Priorities List (NPL). EPA continues to work with members of the Washoe Tribe and provide funding through a cooperative agreement. The funds support the Washoe Tribe in hiring technical experts with a tribal perspective. The Washoe Tribe has given helpful comments on site documents including the ecological and human health risk assessment workplans.

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San Francisco, CA 94105
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Talk with one of the EPA or Washoe Tribe of Nevada &
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